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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/485,325	05/22/2000	JUERGEN HAHN	10191/1295	1777

26646 7590 10/19/2005

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EXAMINER	
STOCK JR, GORDON J	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/485,325	HAHN ET AL.	
	Examiner	Art Unit	
	Gordon J. Stock	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-14,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11,14 and 15* is/are allowed.

6)☒ Claim(s) *10* is/are rejected.

7)☒ Claim(s) *12,13 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 May 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Amendment received July 27, 2005 has been entered into the file.

Claim Objections

2. **Claim 12** is objected to for the following: on line 16 "the photodetector unit" lacks antecedent basis. Correction is required. **Claims 13 and 17** are objected to for depending from an objected to base claim.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Finarov (5,764,365)** in evidence of **Finarov (5,333,052)** and in view of **Aspnes (3,985,447)** and further in view of **Kawahira (JP 05280937 A).**

As to **claim 10**, Finarov ('365) discloses a measurement apparatus comprising: a light source emitting a beam (Fig. 5c, **120, 130, 132**; col. 7, lines 9-67); a transmitting optical system conveying the beam to an incidence point on the substrate (Fig. 5b, **100, 150, 154**; col. 7, lines 24-58); a photodetector device (Fig. 5c, **186,170,172, 198**); a receiving optical system conveying the reflected beam to the photodetector device (Fig. 5c, **156, 152, 102**; col. 7, lines 35-37; col. 8, lines 46-64); the receiving optical system including an analyzer (Fig. 5c, **160**); an evaluation device, a data processor (col. 11, lines 19-20); an angle measurement device calculating an angle of the reflected beam at the incidence point (Fig. 5c, **152, 194, 196**, and **198**; col. 10, lines 65-67; col. 11, lines 1-6); the polarization direction of the beam and of the analyzer being modified in time relative to one another (Fig. 5b, **124** and **140**; Fig. 5c, **160** and **162**).

As for sensing versus calculating an angle, an angle is calculated from a light ray that constitutes an angle comprising the detected ray and a reference ray such as the incident ray or a reference line such as a normal to the surface of the substrate; thereby, if an angle is calculated it must be sensed in order to perform the calculation.

Finarov ('365) is silent concerning the determination of the film thickness as a function of the sensed angle and the intensity changes. However, Finarov ('365) implies the film thickness is a function of the sensed angle and intensity changes, for ellipsometric measurements comprise measuring changes in polarization of light by reflectance and ,subsequently, from amplitude and phase changes. And Aspnes in a measurement of thin films states the dependence of amplitude and phase on angles, intensities, and reflectances (col. 4, lines 15-67; col. 5, lines 1-65). Further in evidence Finarov ('052) demonstrates relations of the variables in thickness measurements (cols. 5-7). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that film thickness would be determined as a function of intensity changes and angles, for Finarov's ('365) system measures amplitude and phase changes to determine thickness which are proportional to an angle and intensity.

As for the tangential plane not intersecting the substrate in an area of incidence, Finarov ('365) does not explicitly state this, but implies that the angle measurement is relative to a tangential plane, a plane substantially parallel to the plane of the substrate, suggested by Fig. 5a; whereas, the tangential plane comprises the dotted line that is perpendicular to the line normal to the plane of the substrate. However, Kawahira in an ellipsometer system teaches using two tangential planes from two points outside the measuring region to determine a corrected incidence angle due to wafer unevenness (abstract; paragraphs 0014-0016 of machine

translation). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the sensed angle be relative to a tangential plane that does not intersect the substrate in the area of the incidence point in order to have the incidence angle sensed compensated for wafer unevenness.

In addition, Finarov ('365) discloses the angle measurement device including a photodetector unit that is position-sensitive in at least one of an X and Y direction (col. 11, lines 1-6) with an angle of reflection being calculated from position data with an evaluation stage (col. 11, lines 7-21) and suggests distance data from the displacement of light spot (col. 11, lines 7-21). In addition, Kawahira discloses the use of distance data such as between two planes to calculate incidence angle (abstract). Therefore, it would be obvious to one skilled in the art at the time the invention was made to have the angle of reflection be calculated from distance data in order to compensate for wafer unevenness.

Allowable Subject Matter

5. **Claims 11, 14, and 16** are allowed.

Claims 12, 13, and 17 would be allowable if rewritten to overcome objection stated above.

As to **claim 11**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an ellipsometer measurement apparatus intensity changes and position data sensed with same photodetector, in combination with the rest of the limitations of **claims 11, 14, and 16.**

As to **claim 12**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an ellipsometer measurement apparatus two position-sensitive photodetectors

arranged at different distances from the incident point, in combination with the rest of the limitations of **claims 12, 13, and 17.**

Response to Arguments

6. Applicant's arguments, see Remarks, filed July 27, 2005, with respect to **claims 11, 14, and 16** have been fully considered and are persuasive. The rejection of **claims 11, 14, and 16** under 35 U.S.C. 103(a) has been withdrawn. As for the remarks of July 27, 2005 in regards to **claims 12, 13, and 17**, the Examiner has found the arguments persuasive. Due to the amendment to the claims and persuasiveness of the arguments, rejection of **claims 12, 13, and 17** under 35 U.S.C. 103(a) has been withdrawn. As for the arguments of July 27, 2005 in regards to **claim 10**, Examiner did not find the arguments persuasive. Specifically, that **Finarov '365** and **Kawahira (JP 05280937 A)** do not disclose the use of distance data, Examiner disagrees. Finarov ('365) discloses the angle measurement device including a photodetector unit that is position-sensitive in at least one of an X and Y direction (col. 11, lines 1-6) with an angle of reflection being calculated from position data with an evaluation stage (col. 11, lines 7-21) and suggests distance data from the displacement of light spot (col. 11, lines 7-21). In addition, Kawahira discloses the use of distance data such as between two planes to calculate incidence angle (abstract). Therefore, it would be obvious to one skilled in the art at the time the invention was made to have the angle of reflection be calculated from distance data in order to compensate for wafer unevenness.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(571) 273-8300**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs
February 28, 2005
Art Unit 2877

Gregory J. Toatley, Jr.
Supervisory Patent Examiner